REMARKS

Favorable reconsideration of this application is requested in view of the following remarks.

Claims 1-3, 12-13, and 15-16 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (U.S. Patent Application Publication No. 2003/0091923) in view of Nakamura et al. (U.S. Patent Application Publication No. 2002/0064724) and Tamura et al. (U.S. Patent Application Publication No. 2002/0076638). Applicants respectfully traverse this rejection.

With respect to the wax in the toner, this rejection relies on Tamura's disclosure. Claim 1 recites that the wax A) is a synthetic wax, which is a reacted compound of C_4-C_{30} long chain alkyl alcohol, unsaturated polycarboxylic acid or anhydride thereof, and unsaturated hydrocarbon wax.

Tamura discloses a long list of waxes contained in a toner such as aliphatic hydrocarbon wax (for example, Fischer-Tropsh wax, which is apparently "Fischer-Tropsch wax"), oxides of the aliphatic hydrocarbon wax or block copolymers thereof, vegetable wax, animal wax, mineral wax, fatty ester wax, whole- or partially-deoxidized fatty acid, saturated straight-chain fatty acid (for example, long-chain alkylcarboxylic acid having a long-chain alkyl group), unsaturated fatty acid, saturated alcohol (for example, long-chain alkyl alcohol), polyhydric alcohol, fatty acid amide, saturated fatty bisamide, unsaturated fatty acid amide, aromatic bisamide, fatty acid metal salts, grafted wax obtained by grafting vinyl monomers to aliphatic hydrocarbon wax, partially esterified products of polyhydric alcohol with fatty acid, and methyl esterified products having a hydroxyl group (see para. [0037] on page 3). However, none of these waxes disclosed in Tamura is a reacted compound of C_4-C_{30} long chain alkyl alcohol, unsaturated polycarboxylic acid or anhydride thereof, and unsaturated hydrocarbon wax as claim 1 recites.

Tamura discloses Fischer-Tropsch wax as an example of the aliphatic hydrocarbon wax (see *id.*). The Fischer-Tropsch wax is known in the art as synthetic hydrocarbons, which mostly are saturated straight chain hydrocarbons, obtained from CO

and H_2 of natural gas or coal in the presence of a catalyst (see Shah et al., "Introduction" section of "Fischer-Tropsch wax characterization and upgrading final report", US Department of Energy under contract no. DE-AC22-85PC80017, available at http://www.fischer-tropsch.org/DOE/DOE_reports/88014638/de88014638_toc.htm, of which the introduction section is attached hereto). Consequently, the Fischer-Tropsch wax is not the reacted compound of the C_4-C_{30} long chain alkyl alcohol, unsaturated polycarboxylic acid or anhydride thereof, and unsaturated hydrocarbon wax as claim 1 recites. In addition, Tamura lists long-chain alcohol as an example of the saturated alcohol, separately from the Fischer-Tropsch wax (see para. [0037] on page 3). Thus, it is clear that the Fischer-Tropsch wax is not a long-chain alcohol.

The grafted wax obtained by grafting vinyl monomers to aliphatic hydrocarbon wax, partially esterified products of polyhydric alcohol with fatty acid, and methyl esterified products having a hydroxyl group might be considered as wax obtained by a reaction of components (see paras. [0037]-[0038] on page 3). However, even if the vinyl monomers and aliphatic hydrocarbon wax react and form the grafted wax, Tamura fails to disclose that the grafted wax is a reacted compound of the three components such as the C_4-C_{30} long chain alkyl alcohol, unsaturated polycarboxylic acid or anhydride thereof, and unsaturated hydrocarbon wax as claim 1 recites. Similarly, Tamura's disclosure of the partially esterified products of polyhydric alcohol with fatty acid, i.e., ester of polyhydric alcohol and fatty acid, and methyl esterified products having a hydroxyl group does not teach or suggest the reacted compound of the three components such as the C_4-C_{30} long chain alkyl alcohol, unsaturated polycarboxylic acid or anhydride thereof, and unsaturated hydrocarbon wax as claim 1 recites. Thus, Tamura fails to disclose the wax of claim 1.

Accordingly, claim 1 and claims 2-3, 12-13, and 15-16, which ultimately depend from claim 1, are distinguished from Kobayashi in view of Nakamura and Tamura, and this rejection should be withdrawn.

Claims 8-10 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (U.S. Patent Application Publication No. 2003/0091923) in view of Nakamura et al. (U.S. Patent Application Publication No. 2002/0064724) and Tamura et

al. (U.S. Patent Application Publication No. 2002/0076638) as applied above, and further in view of Shimizu et al. (U.S. Patent No. 6,117,607). Applicants respectfully traverse this rejection.

Claims 8-10, which depend from claim 1, are distinguished from Kobayashi in view of Nakamura and Tamura for at least the same reasons as discussed for claim 1 above.

Shimizu discloses a full color toner for nonmagnetic one-component development usable in a developer, which may include natural or synthetic waxes (see abstract and coln. 8, lines 49-52). Shimizu, however, fails to disclose that the synthetic wax is a reacted compound of the three components such as the C_4-C_{30} long chain alkyl alcohol, unsaturated polycarboxylic acid or anhydride thereof, and unsaturated hydrocarbon wax as claims 8-10 recite, and thus the reference does not remedy the deficiencies of Kobayashi, Nakamura, and Tamura. Accordingly, this rejection should be withdrawn.

Claims 18 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (U.S. Patent Application Publication No. 2003/0091923) in view of Nakamura et al. (U.S. Patent Application Publication No. 2002/0064724) and Tamura et al. (U.S. Patent Application Publication No. 2002/0076638) as applied above, and further in view of Yuasa et al. (U.S. Patent No.6,579,653). Applicants respectfully traverse this rejection.

Claim 18, which depends from claim 1, is distinguished from Kobayashi in view of Nakamura and Tamura for at least the same reasons as discussed for claim 1 above.

Yuasa discloses a toner including a fixing adjuvant (see abstract and coln. 11, lines 25-35) and further discloses that the fixing adjuvant may be paraffin wax, microcrystalline wax, Fischer-Tropsch hydrocarbon wax, polyolefin wax, fatty acid ester, etc. (see coln. 17, lines 42-51). Yuasa, however, fails to disclose that the fixing adjuvant is wax that is a reacted compound of the three components such as the C_4-C_{30} long chain alkyl alcohol, unsaturated polycarboxylic acid or anhydride thereof, and unsaturated hydrocarbon wax as claim 18 recites. Accordingly, Yuasa dose not remedy the deficiencies of Kobayashi, Nakamura, and Tamura, and this rejection should be withdrawn.

In view of the above, Applicants request reconsideration of the application in the form of a Notice of Allowance.

Respectfully submitted,

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FISCHER-TROPSCH WAX CHARACTERIZATION AND UPGRADING FINAL REPORT

PREPARED FOR THE UNITED STATES DEPARTMENT OF ENERGY UNDER CONTRACT NO. DE-AC22-85PC80017

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1.0 INTRODUCTION

The Fischer-Tropsch reaction is a fundamental component of indirect coal liquefaction. As the first step, coal or other carbon-containing solid materials are gasified to produce synthesis gas composed primarily of hydrogen and carbon monoxide. In the Fischer-Tropsch reaction, these synthesis gas components are rebuilt into a wide range of hydrocarbons, from methane to paraffinic wax (1).

The distribution of Fischer-Tropsch products can be described by the Anderson-Schulz-Flory polymerization law by which the probability of step-wise chain growth of hydrocarbons is independent of carbon number. The chain-growth probability has been shown to be a fundamental property of the catalyst and operating conditions and determines the overall product distribution (2).

In Fischer-Tropsch processing, it is possible to adjust selectivity to specific product distributions through the careful choice of catalysts and process operating conditions (3). It is generally desired to maximize the production of transportation fuels. One consequence of the Anderson-Schultz-Flory law, however, is that a wide range of products will be produced. Accordingly, the theoretical maximum yield of transportation fuel is relatively low.

If maximum gasoline yield is desired, for example, a penalty must be paid through the associated production of light ends (C_1-C_4). This type of operation is typical of Fischer-Tropsch synthesis in ebullating-bed reactors. Fixed-bed reactors, on the other hand, operate under conditions that favor the production of diesel range products. Less light ends are made because operations favor high chain growth. In this mode, however, a large fraction of waxy material is produced (C_{24}+). In either case, production of transportation fuels has associated with it the generation of a relatively large amount of less desirable by-products (Table 1.1).

Recent indirect coal liquefaction work has focused on the development of highly active Fischer-Tropsch catalysts and advanced reactor designs that minimize the production of light hydrocarbons and waxes while maximizing the production of transportation fuels (4). Significant advances continue to be made in these areas. Nevertheless, given the fundamental constraints in controlling Fischer-Tropsch product distributions, it appears likely that upgrading of Fischer-Tropsch light ends and wax by-products will remain an important consideration for indirect coal liquefaction.

Table 1.1

Fischer-Tropsch Product Distribution

	Wt-%	
Product	Fixed-Bed	Synthol
C_4 (Minus)	13.3	43.0
C_5-C_{11} (Gasoline)	18.0	40.0
C_{12}-C_{18} (Diesel)	14.0	7.0
C_{19+} (Wax)	52.0	4.0
Water Soluble Chemicals	2.7	6.0